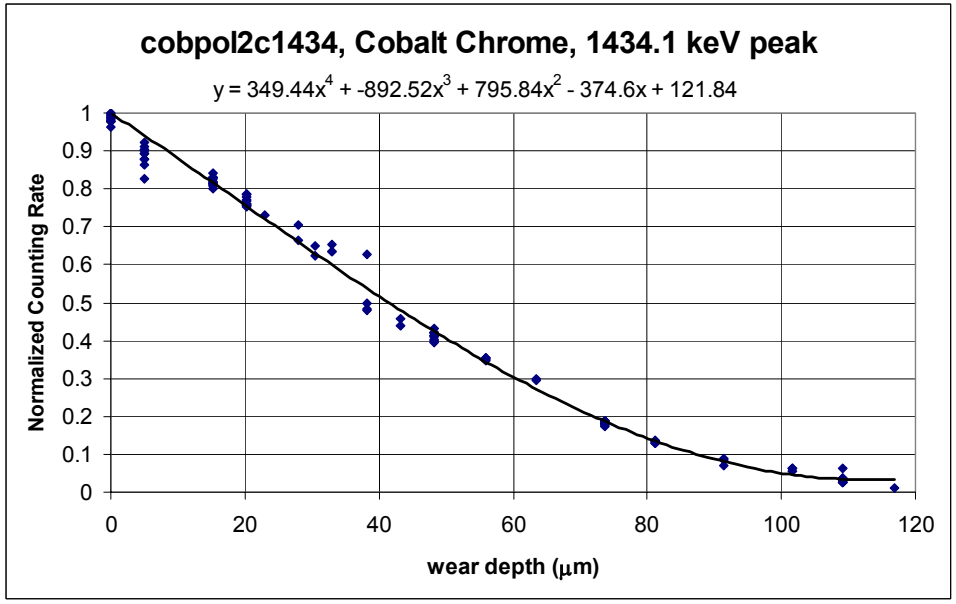
Gamma Spectroscopy-Based Study of Wear of Surfaces

Todd VanGorden, Pittsburg State University, DMR 0097382

Although the surface layer activation technique has previously been used to measure wear of various materials, there are no publications listing its use with prosthetic knee and hip implants. This study presents calibration curves obtained from samples of some of the materials used in these prosthetics. With the completion of these calibrations, samples of prosthetic materials can be placed in wear simulators and their wear determined using the same equipment of this study. Further, a prosthetic implant could undergo surface layer activation before implantation, and its wear determined in situ, without the need for surgery.



Calibration curve obtained from cobalt chrome "bullet" sample (VanGorden, Willis, Blatchley).

Here the cobalt chrome "bullet" sample is placed near the scintillator detector.

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Dr. Charles Blatchley, chair, departments of physics and chemistry at PSU and member, executive board of the PSU REU/RET program, regularly conducts workshops for the participants on such subjects as “Solid State Electronics”, “Red Cross CPR Methods” and “Effective Use of PowerPoint in Presentations”.

Chemistry Major Rihanne Bohannon, one of the participants in the 2003 REU program at Pittsburg State University, is shown here presenting her research project findings at the Sixth Annual Campus-wide Symposium of the PSU/NSF-REU/RET Program. Her ethics paper was co-winner of the program director’s ethics paper award.